UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street, H-6-4
San Francisco, CA 94105

March 22, 1995

Hugo P. Fleischman
US Environmental Protection Agency
MC: 5203G
401 M Street, SW
Washington, DC 20460

RE: EPA Five Year Review for the Fairchild Semiconductor Site, South San Jose

Dear Mr. Fleischman:

Enclosed is the Five Year Review for the Fairchild Semiconductor Site, South San Jose, CA. You may contact me at (415) 744-2280 with any questions.

Sincerely,

Belinda Wei
Superfund Project Manager

Enclosure

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

MEMORANDUM

SUBJECT: Five-Year Review for the Fairchild Semiconductor Superfund Site, South San Jose

FROM: Nate Lau, Acting Chief
Remedial Action Branch

TO: Keith Takata, Deputy Director
Office of Superfund Programs
Hazardous Waste Management Division

I. INTRODUCTION

Attached, please find a copy of the Fairchild Five Year Review prepared by the California Regional Water Quality Control Board. EPA has reviewed their Five Year Review and adopts their recommendations as written. The Regional Board's Five Year Review is summarized below.

Because contaminant levels will allow for unlimited use and unrestricted exposure upon achieving ROD goals, this Five-Year Review is not required by the statute (section 121(c) of CERCLA, as amended) or Section 300.430(f)(4)(ii)) of the NCP, which implements CERCLA. However, because clean-up will take five or more years to attain, this Five-Year Review must be conducted as a matter of Agency policy (OSWER Directive 9355.7-02, 5/31/91, p.2).

II. FIVE YEAR REVIEW SUMMARY

The Fairchild Semiconductor site was listed on the NPL on October 4, 1989. In 1981, Fairchild had found a leaking underground tank that released 60,000 gallons of waste-solvent, creating a plume approximately one mile long and contaminating soils and groundwater down to the C-aquifer. The main contaminants of concern were TCA and DCE. By 1982 Fairchild began interim clean-up measures. On March 20, 1989, the Record of Decision was signed, selecting the following remedies: groundwater extraction and treatment, soil vapor extraction and slurry wall containment.

The soil vapor extraction system operated on-site for 16 months until May 1990, removing 148,000 pounds of VOCs. The groundwater extraction and treatment system was successful at achieving drinking water standards in the entire off-site, and at attaining the stricter clean-up standards for the C-zone off-site

by 1988. Fairchild has stopped extraction for the C-zone and temporarily suspended extraction for the off-site B-zone. For the on-site where the hot-spots exist, the pump and treat system and the slurry wall have effectively contained and reduced the high contaminant levels. The pump and treat system continues to operate within the slurry wall.

III. CONCLUSION

The response actions as selected in the ROD remain effective at protecting human health and the environment (OSWER Directive 9355.7-02, Attachment I, p.2).

Future Policy Five Year Reviews shall be conducted every five years from the approval of the previous Review, until ROD cleanup levels are achieved, assuming they will remain at levels that allow for unlimited use and unrestricted exposure (OSWER Directive 9355.7-02, Attachment I, p.5).

Approve by: [signature] Date: 3/13/95

Keith Takata, Deputy Director
Office of Superfund Programs
Waste Management Division
Region IX

Attachment: Status Report on IBM and Fairchild (San Jose) - Five Year Review

cc: Fairchild Site File

MAIL CODE	H-6-4	H-6-4	H-6	H-1-5		
SURNAME	B. Wei	[illegible]	[illegible]	[illegible]		
DATE	1/19/95	1/19/95	3/10/95	3/13		

U.S. EPA CONCURRENCES **OFFICIAL FILE COPY**

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

I N T E R N A L M E M O

TO: Steven R. Ritchie
Executive Officer

FROM: Stephen Hill
ES IV (Supervisor)

DATE: February 22, 1994

SIGNATURE:

SUBJECT: Status Report on IBM and Fairchild (San Jose) - Five Year Review

CONCUR:

Steven I. Morse, Chief
South Bay Toxics Division

IBM and Fairchild (San Jose) were the first two major VOC contamination cases addressed by the Board in the mid-1980s. Accordingly, they are the first ones to submit a five-year review. This review is intended to determine if the selected cleanup plan is working. Based on the dischargers' submittals and our own evaluation, the cleanup plans **are** working. VOC concentrations in "hot spots" have declined substantially, and both sites have good hydraulic containment of their chemical plumes. At the same time, neither site is close to fully meeting cleanup standards set by the Board. This situation is mirrored in many other groundwater contamination sites locally and around the nation. We may have to settle for containment rather than restoration of some affected groundwater zones. IBM and Fairchild have not requested changes in either their cleanup plans or their cleanup standards, but have not ruled out future requests. I recommend no change in the Board orders for these cleanups at this time. I recommend several administrative actions by the Executive Officer over the next few months to allow "fine tuning" of remediation at these two sites.

Background

IBM and Fairchild (San Jose) were among the first sites in Silicon Valley where soil and groundwater contamination by solvents were discovered. As a result of the Fairchild release, the Regional Board in 1982 sent questionnaires to over 2,000 facilities

in Silicon Valley regarding the use or storage of hazardous materials. Based on survey results and subsequent investigations, EPA proposed adding 28 Silicon Valley sites to the Superfund "National Priority List." Fairchild's south San Jose site was proposed in 1984 and formally designated as a Superfund site in 1989. IBM's site was proposed in 1984 and dropped in 1988, since it is regulated under the federal RCRA law, which has cleanup requirements comparable to the federal Superfund law. EPA Region 9 continues to apply Superfund program requirements to IBM and other "RCRA drop" sites.

The Regional Board established final site cleanup requirements (SCRs) for IBM in late 1988 (Order No. 88-157) and for Fairchild in early 1989 (Order No. 89-16). These were the first final SCRs adopted by the Regional Board. In both orders, groundwater cleanup standards were proposed and set at roughly one-quarter of the drinking water standards for the contaminants. This very stringent approach was chosen in large part because both sites are located in a critical recharge area. Shallow groundwater in this portion of south San Jose recharges the deep aquifer in the San Jose Plain, from which many municipalities extract groundwater.

Both companies have been implementing Board-approved cleanup plans for about five years. Their final SCRs require them to submit a five-year review, which is intended to determine whether the cleanup plan is working as expected. Five-year reviews are also required by the federal Superfund law (Section 121(c)) and implementing regulations (40 CFR 300.430(f)). IBM submitted its review in October 1993, and Fairchild submitted its review in December 1993. Both reviews adequately address the topics identified in the final SCRs and relevant EPA requirements.

IBM Site

Background

IBM operates a plant that manufactures data-processing machines at 5600 Cottle Road in south San Jose (see figure 1). The plant has operated since about 1956 on the 500-acre site. IBM has used various VOCs in its manufacturing process, including chlorinated solvents such as TCA and Freon 113. In 1980 and 1981, IBM discovered VOCs in soil and groundwater as a result of releases from underground tanks and other facilities.

IBM's investigation found widespread groundwater pollution, with chemicals detected up to four miles northwest of the site. Groundwater occurs in several permeable zones in the alluvium underlying the IBM site. The off-site plume contains three chlorinated VOCs (Freon 113, TCA, and 1,1-DCE) and initially reached the Edenvale Gap, a subsurface feature where groundwater flow from the Santa Teresa Basin is constricted before "flowing" to the San Jose Plain. On-site groundwater had higher

contaminant concentrations and a mix of chlorinated and non-chlorinated VOCs, primarily in the first water-bearing zone (the A-zone).

IBM undertook a number of interim remedial measures prior to SCR adoption. It excavated and removed about 23,000 cubic yards of VOC-contaminated soils at various on-site sources areas. It initiated groundwater extraction and treatment in 1983 in the upper two water-bearing zones. Extraction volume peaked at 3,100 million gallons in 1986 (see figure 2). Groundwater extraction was intended to remove chemical mass in source areas and control further plume migration.

The 1988 SCR endorsed IBM's proposed cleanup plan, which called for continued groundwater extraction as well as soil vapor extraction (SVE) to remediate VOC-contaminated soils. The cleanup plan recognized that groundwater elevations were key to the cleanup, and defined three different scenarios depending on future trends in elevations. The SCR set several groundwater cleanup standards:

Groundwater Zone	Cleanup Standard
A-zone	Chemical-specific drinking water standard
B-zone or deeper	0.25 non-carcinogenic hazard index and 1.0 carcinogenic hazard index

The non-carcinogenic hazard index is calculated by summing the hazard associated with each non-carcinogenic chemical. For example, a groundwater sample with 20 ug/l of TCA and 2 ug/l of 1,1-DCE would have a hazard index of 0.43, in excess of the standard. Calculation: 20/200 + 2/6 = 0.1 + 0.33 = 0.43 ... where the denominators represent a "safe" concentration of TCA and 1,1-DCE, respectively. The carcinogenic hazard index is calculated in a similar manner.

The SCR also set a soils cleanup goal of 1 mg/kg, in order to protect shallow groundwater from leaching of VOCs from unsaturated soils. In addition, the SCR required IBM to maximize its reuse of extracted, treated groundwater, in order to conserve water and to maintain groundwater elevations necessary for effective remediation.

Five-Year Review

Since final SCR adoption in October 1988, IBM has complied with all SCR requirements and has implemented its cleanup plan. It has continued groundwater extraction, both on-site and off-site. Extraction rates declined to 370 million gallons in 1993, as a result of optimization and water-conservation efforts (see figure 2). In mid-1992, IBM cut in half its off-site extraction rates, based on past monitoring results and capture-zone analysis. Subsequent monitoring confirmed no net change in the off-site plume.

IBM has installed SVE systems at four on-site locations, and has removed about 50,000 pounds of VOCs from unsaturated soils since 1989. Since January 1991, IBM has achieved 100% reuse of groundwater extracted on-site, using treated groundwater for orchard irrigation, landscape irrigation, and groundwater recharge. Reuse of groundwater extracted off-site has been minimal, due to limited access and demand.

During the five-year period since SCR adoption, IBM has successfully reduced high initial VOC concentrations in shallow groundwater. However, the size of the non-compliant groundwater plume has not changed since 1988. This situation is illustrated well in the on-site A-zone; the area exceeding a carcinogen hazard index of 10 has shrunk significantly, while the area exceeding a non-carcinogen hazard index of 1 is unchanged. This result is also true in the off-site area, where the non-compliant area of the B-zone still extends to Branham Lane, about two miles from the plant boundary (see figure 6).

Since cleanup began, IBM has removed about 245,000 pounds of VOCs, including 17,000 pounds of chlorinated VOCs. Most of this mass came from soil excavation prior to 1988. Since SCR adoption, SVE has removed 63,000 pounds of VOCs. The table below summarizes mass removal since cleanup began:

	VOC Mass Removal (pounds):			
VOC Type	Soil Excavation	Soil Vapor Extraction	Groundwater Extraction	Total
Chlorinated	100	7,800	9,500	17,400
Non-Chlorinated	170,000	55,200	2,200	227,400
Total VOCs	170,100	63,000	11,700	244,800

Groundwater extraction has been effective in removing the more toxic chlorinated VOCs, but has shown diminishing returns since extraction began. Since 1985, VOC removal efficiency has remained stable at 0.3 to 0.7 pounds per million gallons extracted (see figure 4). IBM suspects the presence of dense, non-aqueous phase liquid (DNAPL) in the A-zone at two on-site locations, due to very high VOC groundwater concentrations measured early in the investigation.

IBM has spent nearly $55 million on remediation activities at this site since 1979, including $6 million in pump tax to the Santa Clara Valley Water District. Of this total, $22 million was spent for the five-year period covered in this review. The unit cost of VOC removal during the five-year period was $12 per pound for SVE and $12,000 per pound for groundwater extraction.

Conclusions and Recommendations

SVE has been effective at reducing vadose-zone contamination at the IBM site. Groundwater extraction has effectively reduced “hot spot” concentrations and controlled plume migration, but has not led to attainment of groundwater cleanup standards. IBM should continue to use these two technologies. Reuse of treated groundwater has been maximized. IBM may request another reduction in off-site extraction rates later in 1994. I recommend approving such a request, provided that plume control is assured.

Fairchild Site

Background

Fairchild operated a semiconductor fabrication plant at 101 Bernal Road in south San Jose from 1977 to 1983 (see figure 1). The 24-acre site is located about one mile southeast of the IBM site. In late 1981, Fairchild discovered that an underground waste-solvent tank had failed, releasing a mixture of chlorinated and non-chlorinated solvents. Great Oaks Water Company found VOCs from this release in a down-gradient well, which was immediately shut down and later destroyed.

Fairchild’s investigation found significant soil and groundwater contamination by TCA, 1,1-DCE, and other chlorinated solvents, as well as non-chlorinated solvents such as acetone. Dense non-aqueous phase liquid (DNAPL) is probably present in soil and groundwater on-site. VOCs had migrated off-site in two permeable zones in the alluvium - the B- and C-zones. Municipal and agricultural wells had provided a conduit for VOCs to reach the C-zone. The chemical plume extended about one mile down-gradient to the northwest.

Fairchild undertook several interim remedial measures prior to SCR adoption. In 1982, it removed the failed tank, excavated about 3,400 cubic yards of contaminated soil near the tank, and started groundwater extraction to control VOC migration. Groundwater extraction rates increased rapidly, peaking in 1984 at 3,300 million gallons per year (see figure 3). In 1986, Fairchild constructed a slurry wall around the site to further contain VOC “hot spots”. The slurry wall extended through the first two water-bearing zones - the A- and B-zones.

The 1989 SCR generally endorsed Fairchild’s cleanup plan, which proposed continued groundwater extraction, both on-site and off-site. The SCR, as amended, set groundwater cleanup standards similar to those in the IBM order:

Groundwater Zone	Cleanup Standard
On-site	Chemical-specific drinking water standard
Off-site	0.25 non-carcinogen hazard index

The SCR, as amended, required Fairchild to maximize its reuse of extracted groundwater and to aerate on-site soils in and above the B-zone. Because most of these soils were below the water table, temporary dewatering had to precede aeration. The SCR did not set a soil cleanup standard *per se*. Rather, it required Fairchild to resaturate the on-site groundwater zones after soil aeration, and propose further action if the resaturated zones did not meet drinking water standards.

Five-Year Review

During the five-year period since SCR adoption, Fairchild has complied with all SCR requirements and has implemented the approved cleanup plan. On-site soil aeration was conducted for a 16-month period ending in 1990, removing significant chemical mass. Upon resaturation of the on-site groundwater zones, VOC concentrations had declined but still exceeded cleanup standards near the former tank location. On-site groundwater extraction was suspended during resaturation but resumed in 1991. In late 1991, Fairchild switched to a cyclic extraction program that focused on the remaining “hot spot” area. Groundwater was extracted for one month every quarter. On-site extraction has kept groundwater elevations below those outside the slurry wall, increasing the wall’s reliability as a containment device. In recent months, Fairchild has switched back to continuous extraction, due to rising on-site groundwater elevations following the end of the drought.

On-site VOC concentrations have been reduced substantially since 1989. Peak TCA concentrations are 100 times lower, and peak 1,1-DCE concentrations are about 5 times lower. The area not yet in compliance with cleanup standards has shrunk somewhat, and now covers about 2 acres (see figure 7).

With respect to the off-site area, Fairchild was able to stop extracting groundwater from the C-zone in late 1988 after cleanup standards were met. Fairchild temporarily suspended extraction in the B-zone in late 1991, based on modelling that predicted no change in cleanup time with the pumps off (see figure 3). Subsequent monitoring confirmed the model’s predictions and showed no significant plume migration. As a result, Board staff extended the suspension of pumping into 1994. Drinking water standards are met throughout the off-site area. Since 1989, the size of the area not yet in compliance with the 0.25 hazard index has decreased somewhat (see figure 7).

Fairchild has documented the *in situ* transformation of dissolved TCA to the more toxic 1,1-DCE in shallow groundwater. This physical change in the VOC molecule happens under ambient sub-surface conditions; about 20% of the TCA is converted to

1,1-DCE and the rest to non-toxic chemicals. Board staff were at one point concerned that suspension of off-site pumping would exacerbate 1,1-DCE formation and thereby delay cleanup. Fairchild's 5-year review and supplemental information suggest that 1,1-DCE formation will not prolong cleanup, whether or not off-site pumping resumes, due to natural attenuation. We tentatively agree with this assessment, but have asked Fairchild to re-examine this issue in the future.

Since cleanup began, Fairchild has removed about 145,000 pounds of VOCs, including about 38,000 pounds of chlorinated VOCs. Most of this mass came from groundwater extraction prior to 1988. Since SCR adoption, Fairchild has removed about 15,000 pounds of VOCs, almost all from the on-site soil aeration program. The table below summarizes mass removal since cleanup began:

	VOC Mass Removal (pounds):			
VOC Type	Soil Excavation	Soil Vapor Extraction	Groundwater Extraction	Total
Chlorinated	6,800	9,400	22,000	38,200
Non-Chlorinated	31,200	5,400	70,200	106,800
Total VOCs	38,000	14,800	92,200	145,000

Groundwater extraction has been highly effective at removing VOCs, in part because the release was discovered and remediated relatively quickly. Like the IBM cleanup, however, Fairchild has seen diminishing returns since extraction began. Since 1986, VOC removal efficiency has remained below 1 pound per million gallons extracted (see figure 5). Recent improvements in removal efficiency can be attributed to the suspension of off-site extraction and the relatively small volume of extracted groundwater from the on-site "hot spot".

Fairchild has spent about $42 million on remediation activities at this site since 1981, including $4.4 million in pump tax to the Santa Clara Valley Water District. Of this total, about $8.2 million was spent for the five-year period covered in this review. The unit cost of VOC removal during the five-year period was $260 per pound for soil aeration and $9,000 per pound for groundwater extraction.

Fairchild has had only limited success in reusing extracted, treated groundwater, due to site constraints. A small percentage of groundwater from off-site extraction wells has been used for crop irrigation at a nearby farm. This reuse ended in late 1991 when off-site extraction was suspended. If future extraction is limited to the on-site area, then groundwater recharge represents the only significant avenue for reuse. Fairchild is re-evaluating reuse alternatives, and will probably propose a recharge project just outside the slurry wall.

Schlumberger Technology Corp., Fairchild's successor, sold the site to SRDC, Inc., in 1990. SRDC has made several redevelopment proposals since then, but the site remains unused. SRDC recently proposed to demolish the former Fairchild building and build a retail shopping center on the site. This proposal would not interfere with on-site remediation, but would require relocating the groundwater treatment unit and associated piping.

Conclusions and Recommendations

Both remediation methods - groundwater extraction and soil aeration - have been effective, in part because of the slurry wall surrounding the site. Cleanup standards have been attained in the C-zone off-site and in portions of the on-site area. Further progress toward meeting cleanup standards will be slow. Fairchild should continue on-site groundwater extraction and should implement a reuse project involving off-site groundwater recharge, if feasible. The suspension of off-site groundwater extraction should continue, provided the non-compliant area does not grow or migrate significantly.

Discussion

Cleanup Technology

IBM and Fairchild have relied on groundwater extraction and various source controls (soil excavation, SVE, and slurry wall) to remediate VOC contamination. These technologies have worked; they have dramatically reduced VOC concentrations in "hot spot" areas and they have kept VOC contamination from spreading further. However, they have not restored beneficial uses of shallow groundwater for the most part, and we do not expect full restoration of uses any time soon. This result is consistent with experience locally and elsewhere in the United States for VOC contamination sites. VOCs tend to become trapped between soil particles in groundwater formations, and dissolve into the groundwater at a relatively slow rate. This "desorption" rate is not affected by groundwater extraction rates. In other words, pumping more groundwater produces a more dilute waste stream with no appreciable change in mass removal rates.

VOCs at these two sites are heavier than water, this creates a special problem. DNAPL (or heavy free product) tends to sink through water-bearing zones and become trapped at the bottom of the zone. Here, it is hard to find or remove, unlike fuel products, which float on top of the water-bearing zone. DNAPL behaves like a buried source of VOCs, releasing dissolved VOCs slowly into groundwater and prolonging cleanup. DNAPL is probably present at each site. No practicable technologies exist to find and remediate DNAPL at this time. The current practice is to contain areas suspected to harbor DNAPL - with slurry walls, groundwater

extraction, or other techniques - and to defer aquifer restoration in these areas. IBM and Fairchild each have adequate containment mechanisms in place for suspected DNAPL areas, and no further actions are appropriate at this time. We should revisit this issue when the next five-year reviews are submitted.

For several years, IBM and Fairchild extracted enormous volumes of groundwater, more than all other VOC cleanup sites in the Bay Area combined. The high volumes were due to several factors: (i) the coarse-grained, high-yielding groundwater zones beneath the sites; (ii) the large area affected by VOCs at each site, and (iii) the sensitivity of the sites, which are located in a major recharge area. At both sites, extraction rates were substantially reduced after a few years as they gained experience with the technology. At Fairchild, one of the groundwater zones cleaned up and needed no further remediation. At IBM and Fairchild, the off-site contaminant plume proved to be relatively fixed in location and unaffected by extraction rates. Current extraction at both sites is concentrated at on-site sources areas. By 1993, IBM and Fairchild together extracted about 374 million gallons per year, or about 33% of the region-wide total for VOC cleanups. If IBM's recharge volume is included, the net extraction drops to only 84 million gallons in 1993, or 7% of the total.

Cleanup Standards

The groundwater cleanup standards in the 1988/1989 final SCRs (hazard indices and individual chemicals) are based on state Department of Health Services (DHS) drinking water "action levels" in effect at that time. Since then, EPA and state DHS have adopted additional Maximum Contaminant Levels (MCLs) for most of the VOCS of concern at these two sites. The standards are unchanged for the two key pollutants - TCA and 1,1-DCE - as shown in the table below:

Selected Chemicals	1988 DHS Action Levels (ppb)	Lower of Current EPA or DHS MCLs (ppb)
Chloroform	6	100
1,1-Dichloroethane (DCA)	20	5
1,1-Dichloroethene (DCE)	6	6
Freon 11	3,400	150
Freon 113	18,000	1,200
Methylene chloride	40	5
Tetrachloroethene (PCE)	4	5
1,1,1-Trichloroethane (TCA)	200	200
Trichoroethene (TCE)	5	5
Xylene	440	1,750

As a practical matter, these changes do not affect the current size or location of the

non-compliant groundwater zones at either site. At IBM, they affect the magnitude of non-compliance at some on-site "hot spots", mostly as a result of the more stringent standard for Freon 113. These changes could potentially delay the time-to-cleanup at the IBM site, but we cannot quantify this effect.

The Fairchild SCR automatically incorporates MCLs that are lower than DHS action levels, but the IBM order does not, and neither order incorporates less stringent MCLs. EPA regulations require a revised Record of Decision (ROD) if cleanup standards for a given site are changed, even if the change is a result of revised drinking water standards (40 CFR Part 300). I recommend no changes to the two SCRs to address this issue, given the minimal effect on compliance and given the procedural burden of any changes.

Attainability

IBM's and Fairchild's SCRs set stringent cleanup standards and require attainment throughout the shallow groundwater zones beneath their sites. The SCRs also contain findings that anticipate the possibility that cleanup standards cannot be reasonably attained. If a discharger convinces the Board that this is the case, then the Board may revise the SCR to establish less stringent standards or different points of compliance. The 1992 Basin Plan amendments (groundwater) establish two mechanisms to address this possibility: (i) modified cleanup standards and (ii) alternative points of compliance. The latter is intended for situations where contaminants are relatively immobile, do not threaten existing or likely beneficial uses, and are not amenable to cleanup.

Both companies have found, after more than five years of remediation, that cleanup standards based on a percentage of MCLs have not been met and will not be met soon over large portions of their contamination zones. This result is consistent with experience elsewhere with groundwater remediation involving chlorinated VOCs, and is often referred to as the "tailing phenomena". Typically, VOC concentrations in groundwater decrease rapidly at the beginning of remediation, but quickly reach a relatively constant level, often substantially above the cleanup standard.

Neither company has requested changes in SCR cleanup standards or point of application at this time. Fairchild may qualify for "alternative points of compliance" because of its slurry wall. Under this mechanism, on-site cleanup standards would be relaxed or deleted, provided that standards were met beyond the slurry wall. I recommend that we revisit this issue at the next five-year review for both sites.

SCR Amendment

The final SCRs adopted in late 1988 and early 1989 do not have expiration dates, and we should amend them only as needed. Since the Fairchild site is a federal Superfund site, any significant changes would require follow-up changes by EPA and would

have to follow Superfund procedural requirements. As noted above, the selected cleanup plans are working and the cleanup standards do not need to be revised. Neither IBM nor Fairchild have requested SCR amendments. Board staff have encountered only minor administrative problems with the final SCRs, and these can be addressed at a staff level. Minor changes, such as revisions to monitoring programs can be accomplished without amending the SCRs; we have approved two changes in the IBM and Fairchild monitoring programs in the last two years. Therefore, I recommend no amendment to the IBM and Fairchild SCRs at this time. The Board should consider amending or revising the SCRs at the ten-year point, unless circumstances dictate a sooner review.

Next Steps

No Board action is needed to respond to IBM's and Fairchild's five-year reviews. I do, however, recommend several administrative actions for these two sites:

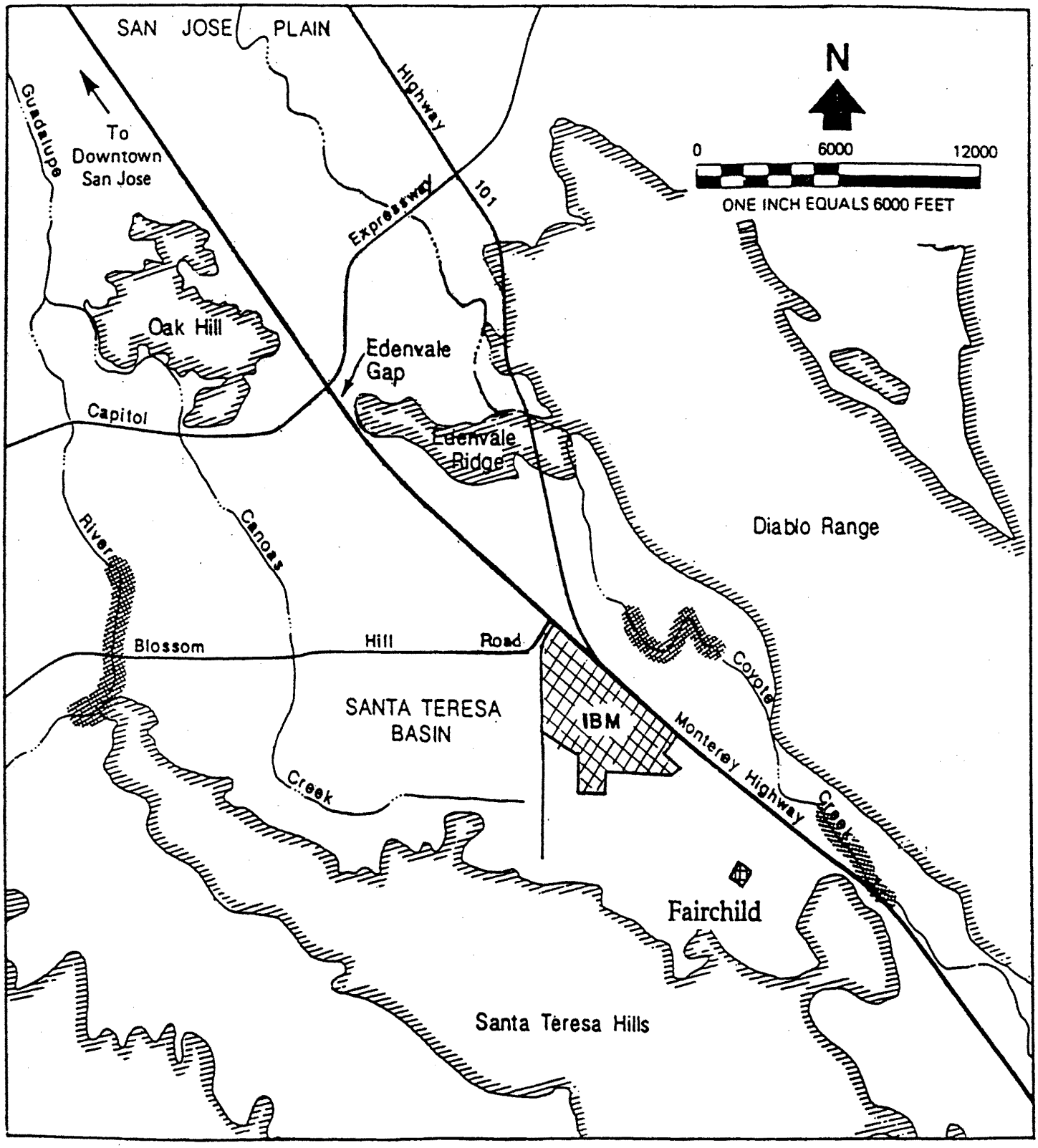
- IBM off-site extraction rates: IBM is likely to request a second reduction in extraction rates. If the request is technically valid, then we should approve the reduction with conditions similar to the July 1992 approval. This action is within the Executive Officer's authority, although Board approval may be preferable if the public still has concerns about this approach.

- Fairchild off-site extraction suspension: Fairchild has proposed to continue the suspension of off-site pumping for the next five years, based on favorable monitoring results since late 1991. I recommend that we approve this request, subject to the type of conditions found in your prior approval.

- Fairchild discharge of treated on-site groundwater: Fairchild will submit a reevaluation of reuse options in late February, and may propose a reinjection project. Any reinjection project would need to be regulated by the Board; Fairchild's existing NPDES permit would be a suitable vehicle. I recommend that we consult with Santa Clara Valley Water District staff as part of our consideration of any reinjection project. If reinjection is infeasible, then we should approve continued discharges to surface waters; this can be done by Executive Officer letter or by NPDES permit amendment. If reinjection is feasible, then we should prepare an NPDES permit amendment for Board consideration.

- Ten year reviews: The two SCRs require five-year reviews but do not anticipate additional evaluations of cleanup performance. We should let both dischargers know that we expect them to prepare a ten-year review. This task can be added to the SCRs when they are next amended or revised by the Board.

Figure 1: Location Map



Note: Derived from figure 1.1 in IBM's five year report

LEGEND

Bedrock

SCVWD recharge ponds

Figure 2: IBM Groundwater Extraction and Reuse

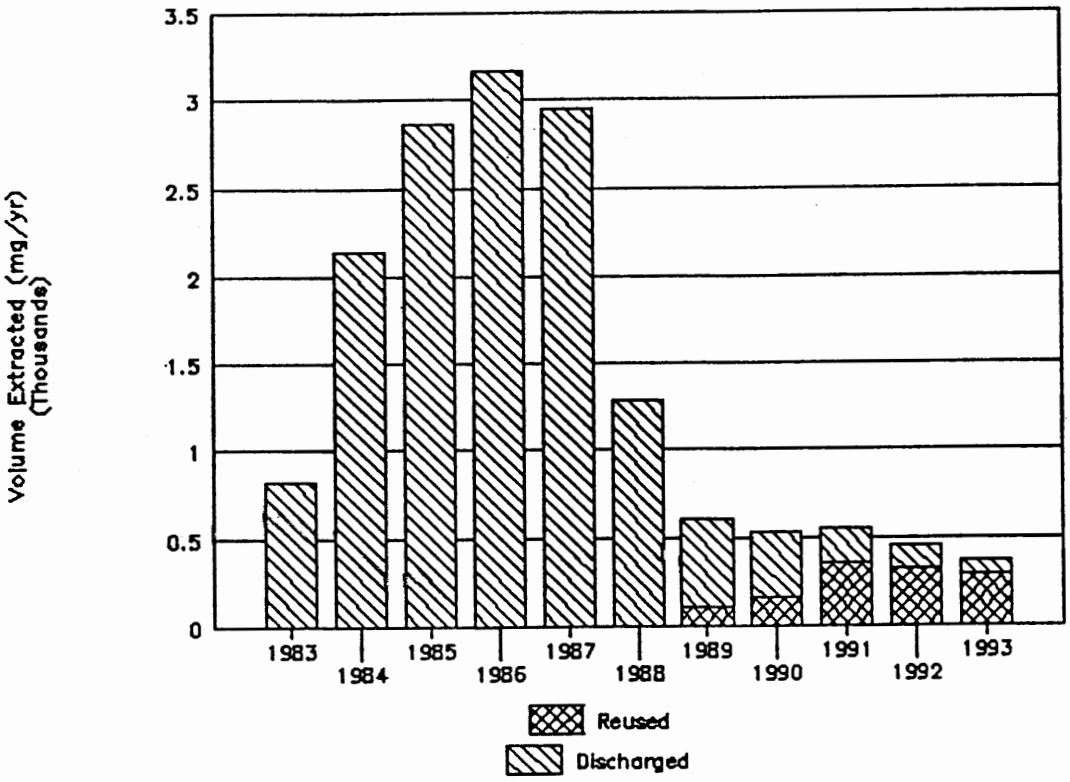


Figure 3: Fairchild Groundwater Extraction and Reuse

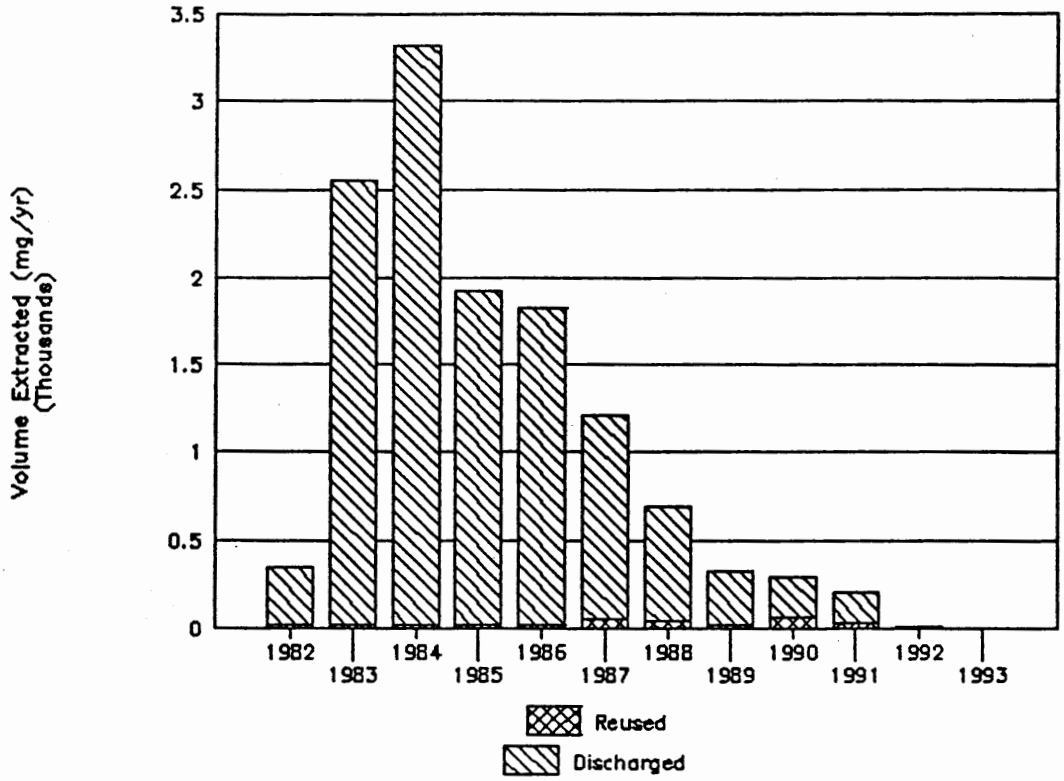
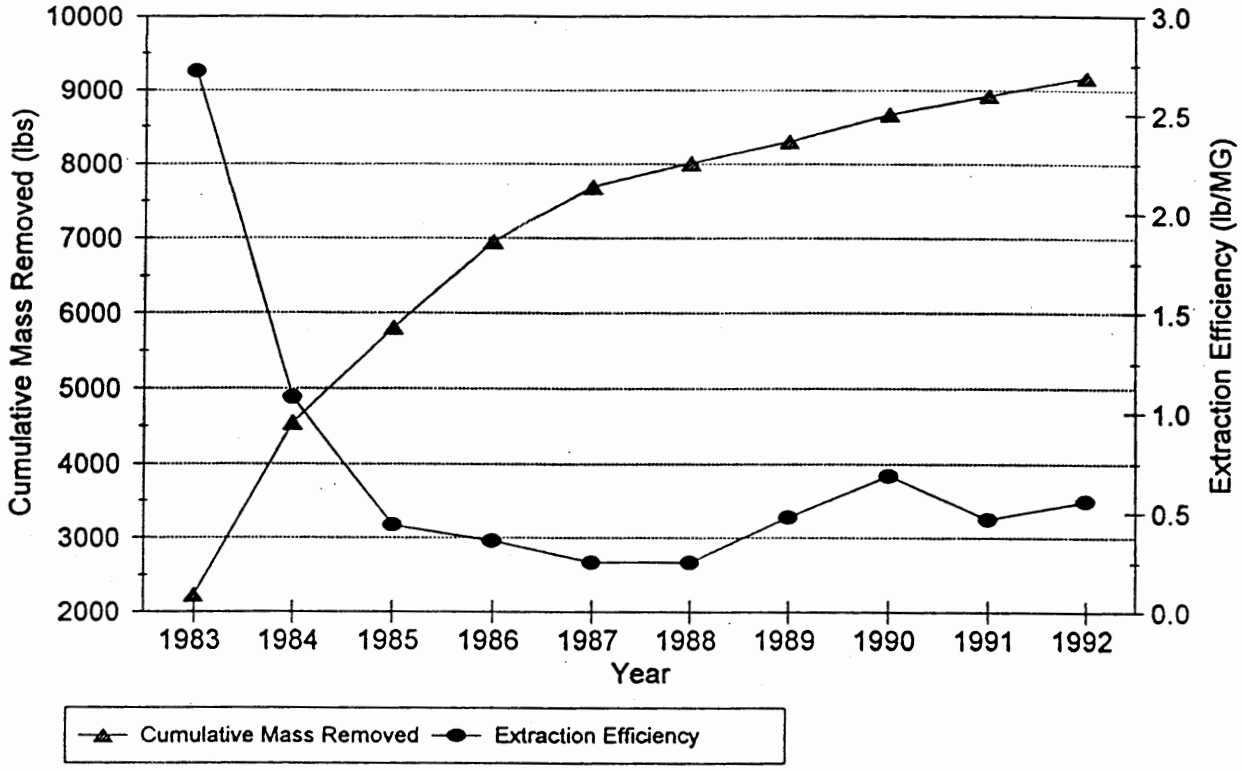


Figure 4: IBM Groundwater Mass Removal and Extraction Efficiency



Note: Appears as figure 4.31 in IBM's five year report

Figure 5: Fairchild Groundwater Extraction Efficiency

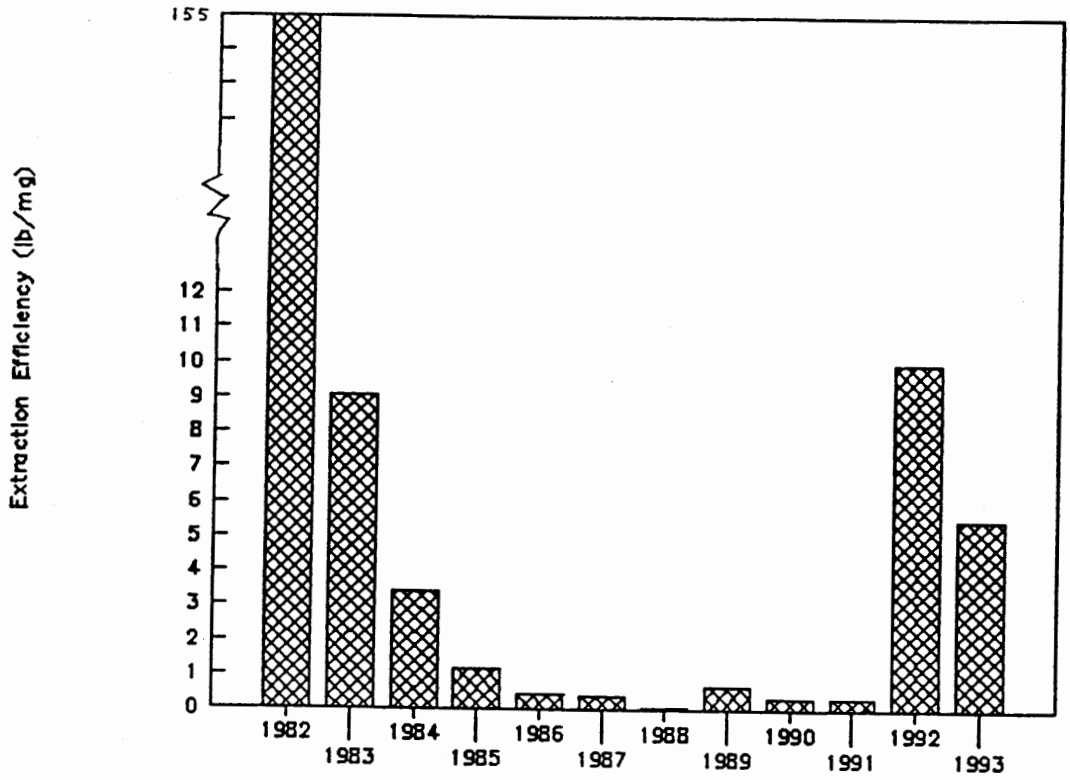
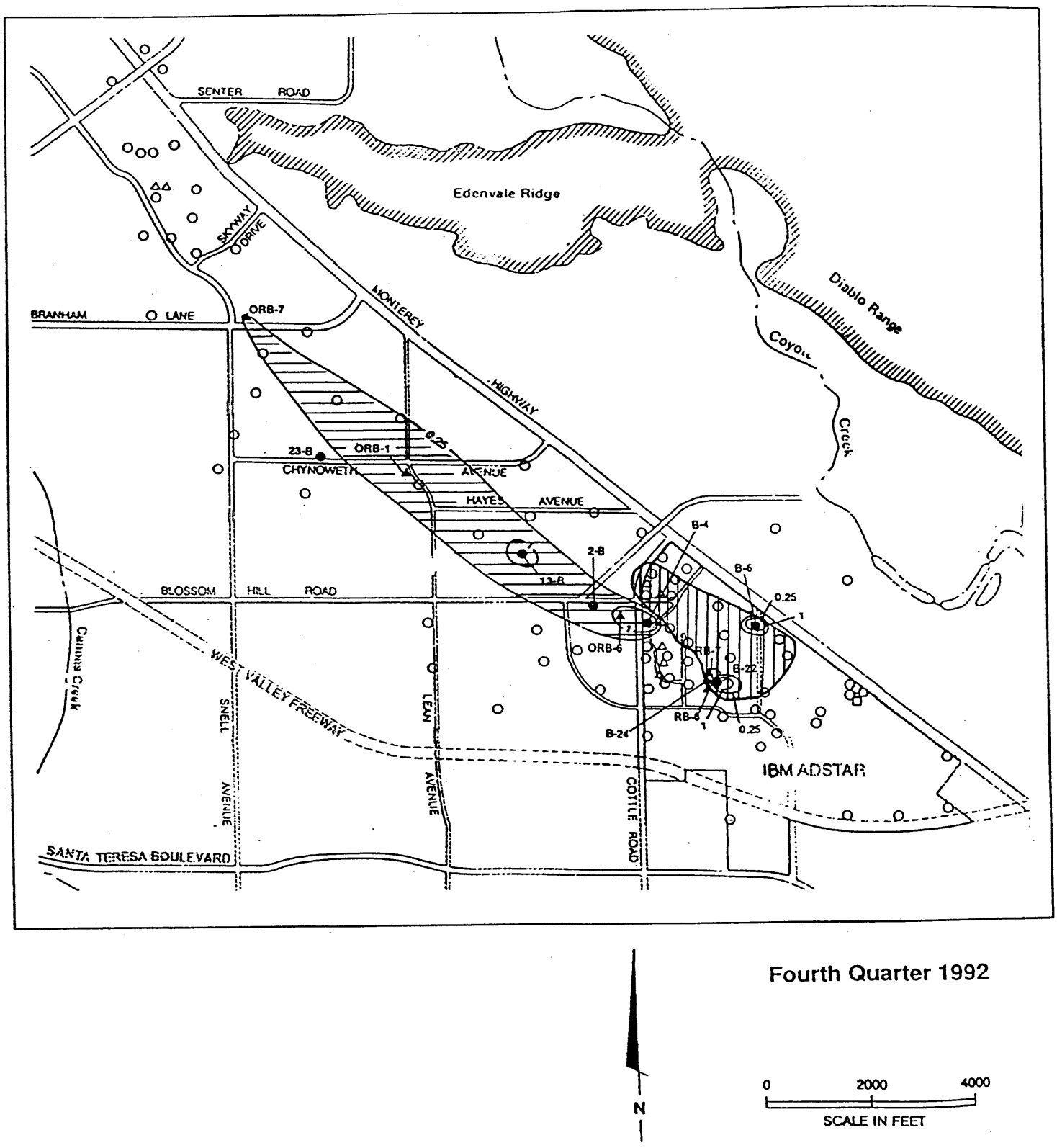
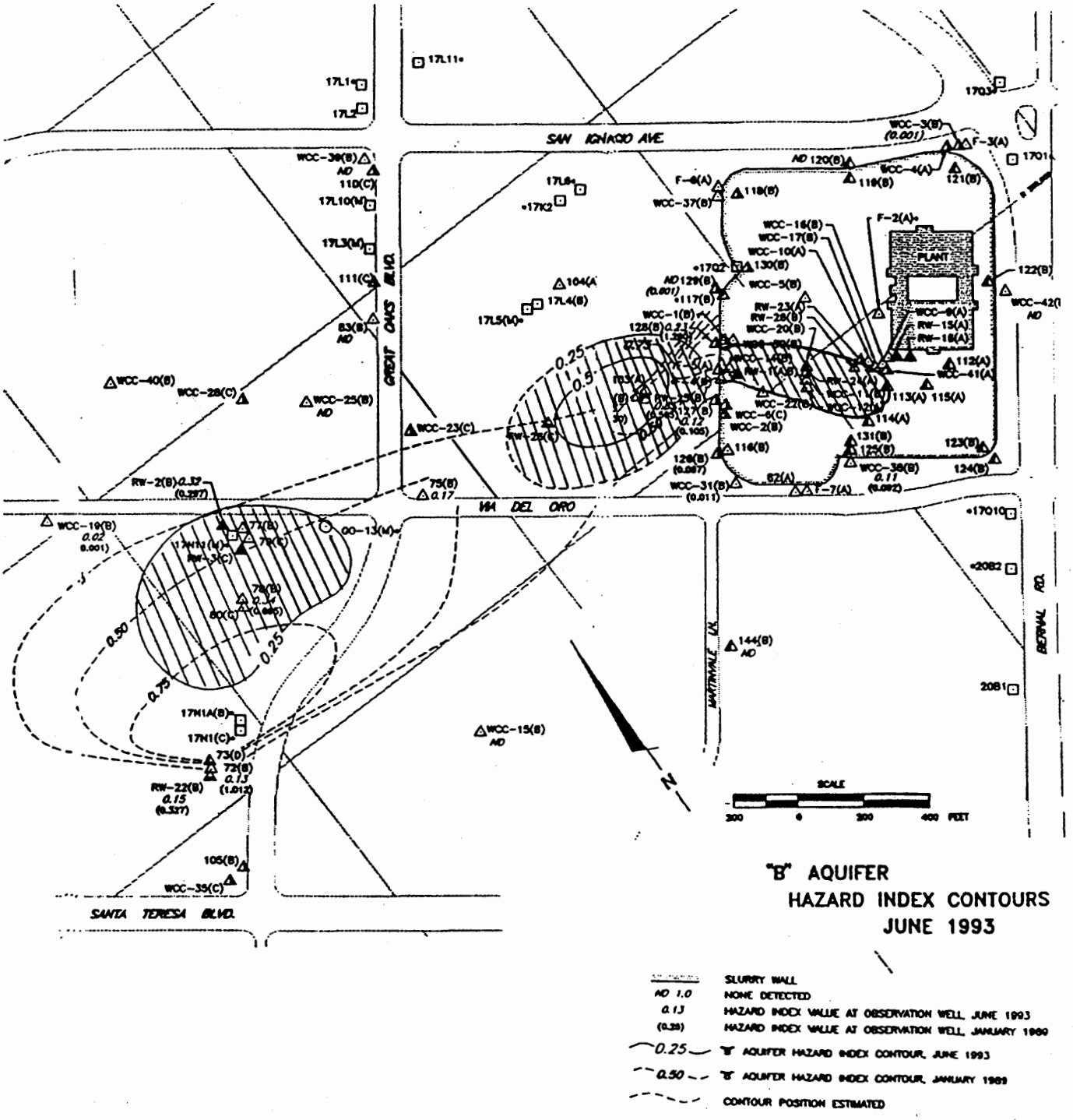


Figure 6: IBM Site Map



Note: Derived from figure 4.27 in IBM's five year report

Figure 7: Fairchild Site Map



Note: Derived from figure 19 in Fairchild's five year report